

An Overview of MAMS (Multiple Access Management Services)

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Motivation

- Devices are capable of Multiconnectivity – Applications have ability to leverage multiple networks
- Application QoE (quality of experience) varies with choice of network paths
 - Performance varies dynamically based on network conditions, e.g. radio conditions, user population, actual network utilization
 - e.g. 1, Wi-Fi offers good capacity with small number of users which quickly degrades, low throughputs and large unpredictable delays due to uplink contention with larger user population.
 - e.g. 2, LTE capacity is limited by available licensed spectrum but offers predictable performance even with increasing number of users
- Deployment configurations determine certain network path choices for applications
 - e.g. Enterprise apps available only via Wi-Fi IP gateway, Cellular operator hosted Cloud only available via cellular IP gateway, VPNs
- Selecting best combination of network paths is essential for consistent and high QoE
 - Dynamically adapt to changing network conditions
 - e.g. Improve enterprise conferencing service (e.g. Skype) by choosing Wi-Fi access in uncongested conditions, Switch only uplink to LTE access as Wi-Fi radio link condition degrades or congestion increases

MAMS - Introduction

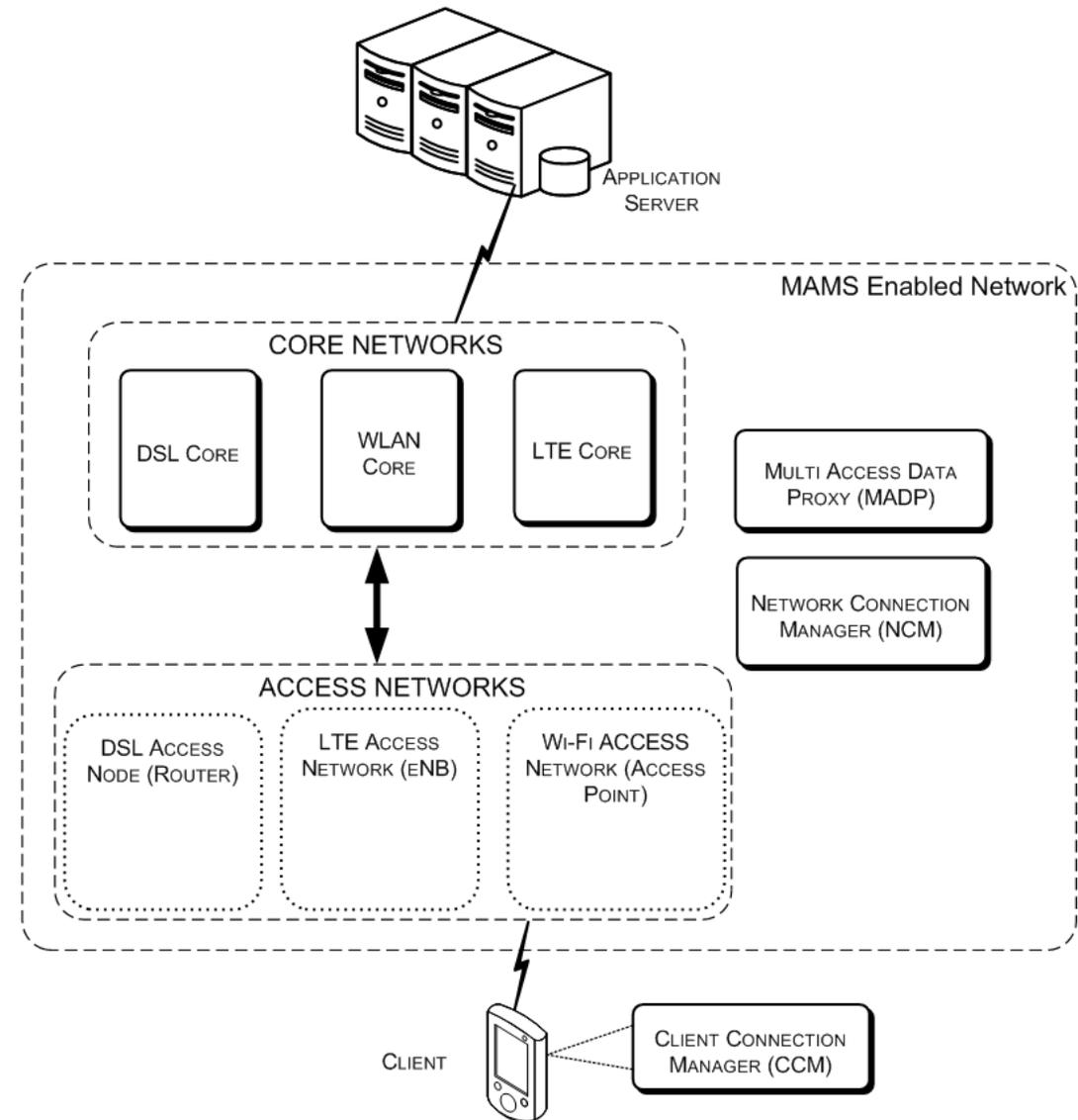
- MAMS is a framework for
 - Loose integration of networks based on IP layer interworking,
 - with ability to select access and core network paths independently
 - that can dynamically adapt to changing network conditions
 - based on negotiation between client and network

MAMS - Requirements

- Simplify multi-operator/vendor integration
- Independent UL and DL accesses selection and aggregation
- Network connectivity technology and architecture agnostic integration
 - Enabled by Loose IP layer Interworking and Programmable Network APIs
- Flexible anchoring (Any core/IP gateway + Any access)
 - Flexibly pick network anchor point(s)/IP gateway(s) based on application deployment configurations
- Adaptive path selection for maintaining quality of experience
 - Network analytics based on client reports/network status monitoring
- Support multiple deployment options
 - Network function elements can be flexibly located at different locations

Architectural Framework

- MAMS introduces the following functional elements
 - Network Connection Manager (NCM)
 - Intelligence in the network to configure network paths based on negotiation with the client
 - Multiple Access Data Proxy (MADP)
 - Handles user plane distribution across configured network paths
 - Client Connection Manager (CCM)
 - Negotiates client's capabilities and needs with the NCM and configures network path usage
 - Message exchange between NCM and CCM to enable programmable and dynamic selection of best network paths



Relation to other IETF work

- MAMS is a framework for negotiation of network paths in a multi-network scenarios.
 - Control layer for flexible combination of access and core network paths
 - Dynamic best path selection based on real-time network conditions and utilization.
 - Minimal impact to actual underlying network technology and architecture
- IETF groups are engaged in development of multipath user plane protocols
- MAMS is not bound to any specific user plane protocol, e.g. MPTCP, but provides mechanism to negotiate use of such protocols.
- Network state information from MAMS can be used to optimize user plane operation
- MAMS framework is complementary to such IETF work